

January 23, 2014

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATION  
DEPARTMENT OF ADMINISTRATION

DIVISION OF PURCHASES BID NO. 7548387

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

RHODE ISLAND CONTRACT NO.2013-CT-007

FEDERAL-AID PROJECT NO. FAP Nos: STP-HSIP(012)

**Statewide High Friction Surface Treatments (HSIP Funds)**

The surface treatment locations are on Scituate Avenue (Route 12) and on Meshanticut Valley Parkway in the City of Cranston, County of Providence; on Tunk Hill Road at Matteson Road in the Town of Scituate, County of Providence; on Route 99 south off-ramp onto Eddie Dowling Highway (Route 146) in the Town of Lincoln, County of Providence; on Route 99 north on-ramp from Eddie Dowling Highway (Route 146) in the Town of Lincoln, County of Providence; on Post Road Bypass in the City of Warwick, County of Kent; on Cucumber Hill Road in the Town of Foster, County of Providence; and on Tower Hill Road (Route 1) in the Town of South Kingstown, County of Washington.

CITY/TOWN OF Cranston, Scituate, Lincoln, Foster, Warwick, South Kingstown

COUNTY OF PROVIDENCE, KENT, WASHINGTON

NOTICE TO PROSPECTIVE BIDDERS

ADDENDUM NO. 1 Prospective bidders and all concerned are hereby notified of the following changes in the Plans, Specifications, Proposal and Distribution of Quantities for this contract. These changes shall be incorporated in the Plans, Specifications, Proposal and Distribution of Quantities, and shall become an integral part of the Contract Documents.

**A. General Provisions - Contract Specific**

1. ITEM 1 - BRIEF SCOPE OF WORK

Delete pages CS-1 in its entirety and replace with CS-1 (R-1) attached to this Addendum No. 1. The description has been revised to include a location (Route 99 North on-ramp From Eddie Dowling Highway/Route 146) that was originally included in the plans. Also, erosion control has been called out as a work item.

**B. General Provisions - Job Specific**

1. CODE 401.9901

Delete pages JS-7 thru JS-11 in their entirety and replace them with JS-7 thru JS-11 (R-1) attached to this Addendum No. 1.

CONSTRUCTION METHODS Section E - Application, has been revised. Locations where a friction course may exist have been identified.

CONSTRUCTION METHODS Section F - Field Testing, has been revised. The Contractor shall be responsible for obtaining and compensating a 3rd party testing agency to ensure the in-place friction characteristics meet minimum requirements.


**C. Other Contract Changes**

**1. PROJECT NAME, DESCRIPTION AND LIMITS**

Project Name Updated to "Statewide High Friction Surface Treatments (HSIP Funds).

Project Description Updated To "R.I. Contract No. 2013-CT-007, R.I. Federal Aid Project Nos. STP-HSIP(012) is for the Statewide High Friction Surface Treatments. The work shall include, but not be limited to, removing pavement markings, preparing surface of and installing high friction surface treatments on existing pavements, installing epoxy resin pavement markings, installing post-mounted and barrier-mounted directional, regulatory, and warning signs, installing linear delineation systems on concrete barriers, flagpersons, installing temporary construction signs, plastic pipe barricades, and fluorescent traffic cones, providing truck mounted attenuator with truck mounted flashing arrow board, maintenance and protection of traffic, erosion control, and all other incidentals, complete, in place and accepted as necessary to complete the work of this contract to the satisfaction of the Engineer. "

Project Limits Updated To "The surface treatment locations are on Scituate Avenue (Route 12) and on Meshanticut Valley Parkway in the City of Cranston, County of Providence; on Tunk Hill Road at Matteson Road in the Town of Scituate, County of Providence; on Route 99 south off-ramp onto Eddie Dowling Highway (Route 146) in the Town of Lincoln, County of Providence; on Route 99 north on-ramp from Eddie Dowling Highway (Route 146) in the Town of Lincoln, County of Providence; on Post Road Bypass in the City of Warwick, County of Kent; on Cucumber Hill Road in the Town of Foster, County of Providence; and on Tower Hill Road (Route 1) in the Town of South Kingstown, County of Washington."

  
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RI Department of Transportation  
Chief Engineer

## 1. BRIEF SCOPE OF WORK:

### Description

R.I. Contract No. 2013-CT-007, R.I. Federal Aid Project Nos. STP-HSIP(012) is for the Statewide High Friction Surface Treatments. The surface treatment locations are on Scituate Avenue (Route 12) and on Meshanticut Valley Parkway in the City of Cranston, County of Providence; on Tunk Hill Road at Matteson Road in the Town of Scituate, County of Providence; on Route 99 south off-ramp onto Eddie Dowling Highway (Route 146) in the Town of Lincoln, County of Providence; on Route 99 north on-ramp from Eddie Dowling Highway (Route 146) in the Town of Lincoln, County of Providence; on Post Road Bypass in the City of Warwick, County of Kent; on Cucumber Hill Road in the Town of Foster, County of Providence; and on Tower Hill Road (Route 1) in the Town of South Kingstown, County of Washington.

The work shall include, but not be limited to, removing pavement markings, preparing surface of and installing high friction surface treatments on existing pavements, installing epoxy resin pavement markings, installing post-mounted and barrier-mounted directional, regulatory, and warning signs, installing linear delineation systems on concrete barriers, flagpersons, installing temporary construction signs, plastic pipe barricades, and fluorescent traffic cones, providing truck mounted attenuator with truck mounted flashing arrow board, maintenance and protection of traffic, erosion control, and all other incidentals, complete, in place and accepted as necessary to complete the work of this contract to the satisfaction of the Engineer.

All work shall be substantially complete on or before August 21, 2014.

## 2. LIST OF CONTRACT DRAWINGS:

<u>Sheet No.</u>	<u>Description</u>
1	Cover Sheet
2	Standard Plan Symbols & Standard Legend
3	Standard Notes – 1
4	Standard Notes -2
5	Job Specific Plan Symbols, General Legend & Notes
6	Barrier Mounted Sign Post Details
7 – 8	Key Plans 1 - 2
9 – 15	High Friction Surface Treatment Location Plans - 1 through 8
16 – 17	Traffic Control Details 1 - 2

## 3. UTILITY, PUBLIC SAFETY, AND MUNICIPAL NOTIFICATION AND COORDINATION:

Upon award, the Contractor shall notify all applicable utility companies and departments of public safety relative to their anticipated construction start date. Immediately following the Pre-construction Conference, the Contractor shall initiate all required utility notifications. The Contractor shall coordinate his work to ensure that all utility cut-offs may proceed without delay. The Contractor shall coordinate his work operations with the appropriate utility companies for the preparation of their involvement prior to beginning any other work on the project.

RIDOT Chief Design Engineer	(401) 222-2023
RIDEM Oil Spills	(401) 222-1360
RIDOT Maintenance Division	(401) 222-2378

**JOB SPECIFIC**

**CODE 401.9901**

**HIGH FRICTION SURFACE TREATMENT**

**DESCRIPTION:** This work consists of cleaning and preparing existing pavement surfaces and furnishing and applying a binder resin system and high friction aggregate on pavement surfaces to provide a friction surface to the lines shown on the Plans or as directed by the Engineer.

**INSTALLER QUALIFICATIONS:** Contractor shall submit for the Engineer's approval a list of at least three (3) projects completed by the Installer within the past five (5) years on which a cumulative minimum of 10,000 square yards of high friction surface treatment has been placed demonstrating a friction reading of 65 skid resistant value (SRV), or better. The project list shall include the project name, project location, owner's contact information, the number of square yards of high friction surface treatment installed and the project value. For Contractor reference, the following is a list of three (3) vendors that have successfully installed High Friction Surface Treatment:

DBI Services, Pennsylvania; Dow POLY-CARB Ohio; Transpo Industries, Inc., New York

**MATERIALS:**

**Binder Resin System**

Binder Resin Systems shall be recommended by the manufacturer, and approved by the Engineer, as suitable for use on the intended pavement surface and for the potential range of atmospheric exposure. A primer, or polymeric resin that is used to fill cracks and voids in existing pavement surface that is compatible with the Binder Resin System, shall be used before application of the Binder Resin System, when recommended by the Manufacturer. The properly proportioned and mixed binder shall conform to the requirements of Table 1.

Independent laboratory reports per formulation shall be provided, documenting that the resin binder meets the requirements of this section. A sample of the resin binder and components in the lot/batch shall be supplied to the Engineer upon request. Failure to comply with the specified material properties shall result in the rejection of the material lot/batch provided.

**Calcined Bauxite Aggregate Surface Topping**

The high friction aggregate shall be calcined bauxite that is clean, dry, and free from foreign matter. The Contractor shall submit a Certificate of Compliance showing that the calcined bauxite aggregate conforms to the physical and chemical requirements of Table 2.

Table 1 – Physical Requirements of the Binder Resin System

Property	Test Method	Requirements	
		Epoxy Resin	MMA Resin
Viscosity	ASTM D-2556	Class C: 7-30 poises	Class C: 12-20 poises
Gel Time	AASHTO M-235	Class C: 10 minutes min	Class C: 10 minutes min
Ultimate Tensile Strength	AASHTO M-235	2000-5000 psi	1500-5000 psi
Elongation at break point	AASHTO M-235	30-70%	30-70%
Durometer Hardness (shore D)	ASTM D-2240	60-80	40-75
Compressive Strength	ASTM C-579	1600 psi min	1600 psi min
Compressive Strength	AASHTO M-235	1000 psi min (at 3 hours) 5000 psi min (at 7 days)	1000 psi min (at 3 hours) 2000 psi min (at 7 days)
Cure Rate (Dry through time)	ASTM D-1640	3 hours max	3 hours max
Water Absorption	AASHTO M-235	1% max	1% max
Adhesive Strength @ 24 hours	ASTM C-1583	250 psi min or 100% substrate failure	250 psi min or 100% substrate failure

Table 2 – Physical and Chemical Requirements of the Aggregate

Property	Test Method	Requirements
Polish Stone Value	AASHTO T 279	65 min
Resistance to Degradation	AASHTO T-96	20% max
Aggregate Grading	AASHTO T-27	
Sieve Designation		Mass Percent Passing
No. 4 Sieve Size		100% min Passing
No. 6 Sieve Size		95% min Passing
No. 16 Sieve Size		5% max Passing
Moisture Content	AASHTO T-255	0.2% max
Aluminum Oxide	ASTM C-25	87% min

**CONSTRUCTION METHODS:**

A. Safety Provisions

Personnel shall be thoroughly trained in the safe handling of materials in accordance with the Manufacturer's recommendations.

B. Storage of Materials

Materials shall be stored in accordance within the requirements of **Section 106.06**. MSDS and other information pertaining to the safe practices for the storage, handling and disposal of the materials, and to their health hazards shall be obtained from the manufacturer and posted at storage areas. A copy of such information shall be provided to the Engineer. At no time shall the aggregate be exposed to rain or moisture.

C. Application Conditions:

The Binder Resin System shall not be applied on a wet surface or when the ambient temperature is below 40°F or above 105° F, or when the anticipated weather conditions would prevent the proper application and curing of the surface treatment materials.

D. Surface Preparation:

All pavement surfaces shall be prepared immediately prior to installation of high friction surface treatment. All existing pavement markings that are adjacent to the treatment location shall be protected prior to performing surface preparation. Pavement markings in conflict with the high friction surface treatment or as called out on the Plans or directed by the Engineer shall be removed to the point that they are flush with existing pavement surface by grinding.

Surfaces shall be clean, dry, and free of all dust, oil, debris and any other material that might interfere with the bond between the resin binder material and existing surfaces. All pavement surfaces shall be cleaned using mechanical sweepers and air washed using a minimum of 180 cfm of clean and dry compressed air to remove all dust, debris, and deleterious material. The mechanical sweeper and high pressure air wash shall have sufficient oil traps during cleaning. The air lance shall remain perpendicular to the surface and within 12 inches in height from the surface.

All pavement surfaces contaminated with oils, greases, or other deleterious materials not removed by the surface preparation shall be washed with a mild detergent solution, rinsed with clean potable water, and dried using a hot compressed air lance. Adequate cleaning of all surfaces will be determined by the Engineer.

For applications on new asphalt, a mandatory 30 day cure period shall take place prior to the installation of the epoxy binder and high friction bauxite aggregate. On new concrete surfaces, all curing compounds shall be completely removed prior to installation

Utilities, drainage structures, curbs and any other structure within or adjacent to the treatment location shall be protected from the application of the surface treatment materials.

Pre-treat joints and cracks greater than 1/4 inch in width and depth with the mixed binder resin system specified herein. Once the binder resin in the pre-treated areas has gelled, the installation may proceed.

E. Application

The Contractor shall utilize one of the following methods to apply the binder resin and aggregate wearing course, in accordance with the manufacturer's recommendations.

**Mechanical Application**

Mechanical application shall be performed by an applicator vehicle. The Binder Resin System manufacturer shall approve the use of said automated continuous application device with their material. The applicator shall mechanically mix, meter, monitor, and apply the Binder Resin System and high friction aggregate in one continuous pass. The application vehicle shall feature volumetric metering pumps that continuously mix, meter, and monitor and apply the resin binder and high friction aggregate. If recommended by the manufacturer, metering pumps shall be heated. The automated continuous application vehicle shall have continuous pumping and proportioning devices that blend the Binder Resin System within a controlled system.

The Binder Resin System shall be blended and mixed in the ratio per the manufacturer's specification (+/-2% by volume) and shall be continuously applied once blended. The application vehicle shall be capable of applying a uniform application thickness of 50-65 mils (typical 25-32 sf./gal.). Coverage rate is based upon expected variances in the surface profile of the pavement. The operation should proceed in such a manner that will not allow the mixed material to separate, cure, dry, be exposed or otherwise harden in such a way as to impair retention and bonding of the aggregate. An open-graded friction course shall likely require 2 applications to achieve this requirement. To RIDOT's knowledge, the following locations have a friction course:

- Route 99 north on-ramp from Eddie Dowling Highway (Route 146)
- Route 99 south off-ramp to Eddie Dowling Highway (Route 146)

The Contractor should take into consideration the potential need for 2 applications at these locations if indeed open-graded frictions course exists.

The high friction aggregate shall be applied at 5 minutes (+/- 1 min) of the base resin binder application into the pavement section. The high friction surface aggregate shall be applied mechanically at a rate of 12-15 lbs/sqyd. (achieving saturation) in such a manner that there is no disruption to the leveled binder. It is the responsibility of the Installer to ensure full embedment of the calcined bauxite aggregate. Wet spots shall be covered with the aggregate prior to the gelling of the Binder Resin System. Excess aggregate that can be reused shall be reclaimed by a vacuum sweeper. The recovered aggregate must be clean, uncontaminated, and dry. Additional sweeping shall be applied to all installations three days after the initial installation is completed. Contractor equipment, Installer equipment, and traffic are not permitted on the high friction surface treatment during the curing period, as recommended by the manufacturer. Any disturbance to the high friction surface treatment during the curing process will result in that section being removed and replaced at the Contractor's expense.

#### **Hand Mixing and Application**

For areas where mechanical forms of application are not conducive or economical, as determined by the Engineer, hand-mixed Binder Resin System in accordance to the manufacturer's recommendations shall be used. The Binder Resin System shall be uniformly spread onto the surface using a serrated edge squeegee at a uniform application thickness of 50-65 mils (25-32 sf./gal.). Coverage rate is based upon expected variances in the surface profile of the pavement. A friction course may likely require 2 applications to achieve this requirement.

The high friction surfacing aggregates shall be immediately broadcast at a rate of 12-15 lbs./sq. yd. (achieving saturation) in such a manner that there is no disruption to the leveled binder. It is the responsibility of the Contractor to ensure full embedment of the calcined bauxite aggregate. Wet spots shall be covered with the aggregate prior to the gelling of the Binder Resin System. Excess aggregate that can be reused shall be reclaimed by a vacuum sweeper. The recovered aggregate must be clean, uncontaminated, and dry. Additional sweeping shall be applied to all installations three days after the initial installation is completed. Contractor equipment and traffic is not permitted on the high friction surface treatment during curing period. Any disturbance to the high friction surface treatment during the curing process will result in that section being removed and replaced at the Contractor's expense.

#### **F. Field Testing**

In-place friction characteristics must meet a minimum requirement of 65 FN40R when tested in accordance to ASTM E 274 upon completion of the installation at all locations shown on the Plans or as directed by the Engineer. Field testing to ensure these in-place friction characteristics are met will be performed by a 3rd party testing agency to be obtained and compensated by the Contractor. The testing results shall be forwarded in a timely manner directly to the Engineer. The 3<sup>rd</sup> party testing agency shall be approved by the Engineer. If the Engineer determines the results from the in-place field testing do not meet the minimum requirement of 65 FN40R, the Contractor shall remove the existing high friction surface and reapply the high friction surface course until the minimum requirement is met as determined by the testing agency and the Engineer at no additional cost to the State.

**METHOD OF MEASUREMENT:** "HIGH FRICTION SURFACE TREATMENT" will be measured by the area in "Square Yards" of those existing pavement surfaces actually so-treated and accepted in accordance with the Plans and/or as directed by the Engineer. Material placed outside of the designated treatment area is disregarded in computing the quantity. Surface preparation, including cleaning, sweeping, removal of existing pavement markings, pre-treatment of joint and cracks, and removing and disposing of sweepings and debris will not be measured for payment, but shall be incidental to this work. Field Testing, including the obtaining and full compensation of the 3<sup>rd</sup> party testing agency, will also not be measured for payment but shall be incidental to this work.

**BASIS OF PAYMENT:** The accepted quantity of "HIGH FRICTION SURFACE TREATMENT" will be paid for at the contract unit bid price per "Square Yard" as listed in the Proposal. The price so-stated constitutes full and complete compensation for surface preparation including pre-treatment of joint and cracks and removal of existing pavement markings, furnishing and applying the High Friction Surface Treatment as specified or directed by the Engineer, obtaining and fully compensating the 3<sup>rd</sup> party testing agency, and for all labor, tools, equipment, materials, survey, and all other incidentals required to finish the work, complete, in-place friction characteristics field tested and meeting minimum requirements, and accepted by the Engineer.